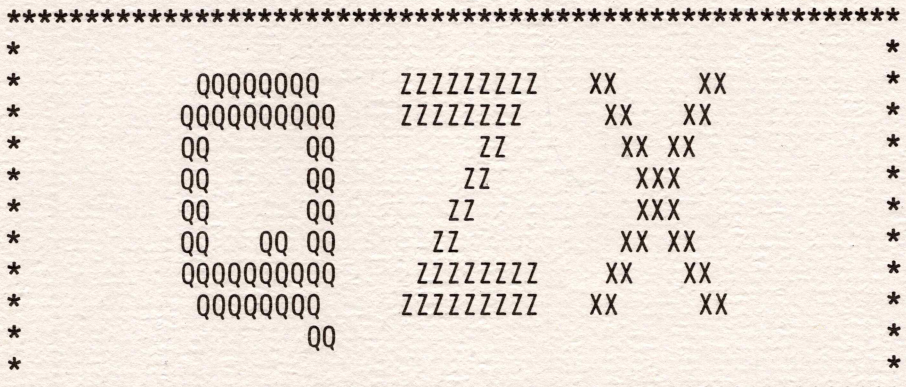
QQQQQQQQ ZZZZZZZZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQ QQ ZZ XX XX
QQ QQ ZZ XXX
QQ QQ ZZ XXX
QQ QQ QQ ZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQQQQQQQ ZZZZZZZZZ XX XX
QQ

The Journal Covering Amateur Radio & Sinclair Computers
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2025 O'Donnell Drive
Las Cruces, New Mexico
88001

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W4GHV
Bo Barry
Editor

Volume 5 Number 5 ($1.50-issue) April 1987

* Logbook Program, from CTM by J. Smith
* Schon Keyboard Add-on for the QL, WA6DLI
* T/S 1000, ZX81 & A Flatbed XY Plotter, WA4BQE
* Unclassified Ads

Logbook

Joe C. Smith, Jr.
(from CTM Magazine (Aug. '86)

This is another program in my HAM Series for the Timex-Sinclair computers.

This program is "LOGBOOK". It is a very good log recording program for the Timex/Sinclair and geared to the Ham radio operator. It appears to have a wide applicability beyond its original orientation.

Options available are:

1) Enter new contact
2) Change previous entry
3) See previous entry
4) Save entries to tape
5) Obtain hard copy of an entry

Type the program in and follow the prompts. I feel you will enjoy using this program as much as I do.

I have also included some more Sinclair User Groups at the end of the program listing.

(Lines without numbers are continuation of the previous line.)

```
  5 REM LOGBOOK"   (K in inverse video)
 10 LET A$=""
 20 LET N=0
 25 LET J=0
 26 GOTO 4050
 30 PRINT "OPTIONS AVAILABLE ARE: - "
 35 PRINT
 40 PRINT "1) ENTER NEW CONTACT"
 50 PRINT "2) CHANGE PREVIOUS ENTRY"
 60 PRINT "3) SEE PREVIOUS ENTRY"
 70 PRINT "4) SAVE ENTRIES TO TAPE"
 80 PRINT "5) OBTAIN HARD COPY OF AN ENTRY
 82 PRINT "   FROM THE PRINTER"
 85 PRINT
 90 PRINT "WHICH OPTION ?(1-5)"
 95 PAUSE 40000
100 LET G=CODE (INKEY$)-28
110 IF G=1 THEN GOTO 1000
120 IF G=2 THEN GOTO 2000
130 IF G=3 THEN GOTO 3000
140 IF G=4 THEN GOTO 4000
150 IF G=5 THEN GOTO 6000
160 GOTO 90
1000 CLS
1010 LET J=J+1
1015 LET N=J
1020 PRINT "WHAT DATE IS IT?"
1030 INPUT D$
1040 CLS
1050 PRINT "AT WHAT TIME DID THE CONTACT
      START ?"
1060 INPUT T$
1070 CLS
1080  PRINT "AT WHAT TIME DID THE CONTACT
       FINISH ?"
1090 INPUT F$
1100 CLS
1110 PRINT "WHAT IS THE CALLSIGN ?"
1120 INPUT C$
1130 CLS
1140 PRINT "ANY NOTES ?"
1150 INPUT N$
1160 CLS
1180 LET A$=A$+"+"+CHR$ (N)+CHR$ (13)+D$+CHR$
     (13)+T$+CHR$ (13)+F$+CHR$ (13)+C$+CHR$
     (13)+N$+CHR$ (13)+"+"
1190 GOSUB 5000
1200 GOTO 30
2000 CLS
2005 PRINT "WHICH ENTRY DO YOU WANT TO
      CHANGE ?"
2010 INPUT N
2020 CLS
2030 GOSUB 5000
2040 PRINT
2050 PRINT "DO YOU WISH TO CHANGE THE DATE ?
     (Y/N)"
2060 PAUSE 40000
2070 IF INKEY$="Y" THEN GOSUB 2500
2080 PRINT "DO YOU WISH TO CHANGE THE START
     TIME ? (Y/N)"
2090 PAUSE 40000
2100 IF INKEY$="Y" THEN GOSUB 2600
2110 PRINT "DO YOU WISH TO CHANGE THE TIME
     THE CONTACT FINISHED ? (Y/N)"
2120 PAUSE 40000
2130 IF INKEY$="Y" THEN GOSUB 2700
2140 PRINT "DO YOU WISH TO CHANGE THE
     CALLSIGN ? (Y/N)"
2150 PAUSE 40000
2155 IF INKEY$="Y" THEN GOSUB 2800
2160 PRINT "DO YOU WANT TO CHANGE THE
     NOTES ? (Y/N)"
2170 PAUSE 40000
2180 IF INKEY$="Y" THEN GOSUB 2900
2190 PAUSE 100
2200 CLS
2210 GOTO 30
2300 PRINT "                                "
2310 PRINT
2320 PRINT "ENTRY NUMBER :";N
2330 PRINT "DATE OF CONTACT :";D$
2340 PRINT "CONTACT STARTED :";T$
2350 PRINT "CONTACT COMPLETED AT :";F$
2355 PRINT "CALLSIGN WAS :";C$
2360 PRINT "NOTES :";N$
2370 PRINT
2380 PRINT "                                "
2390 RETURN
2500 CLS
2510 PRINT "WHAT DO YOU WANT TO CHANGE THE
```

```
        DATE TO ?"
2514 INPUT D$
2515 LET Q=0
2516 LET O=T
2520 LET O=O-1
2530 IF A$(O)=CHR$ 13 THEN LET Q=Q+1
2540 IF Q=4 AND A$(O)=CHR$ 13 THEN LET E=O
2550 IF Q=5 THEN GOTO 2570
2560 GOTO 2520
2570 LET A$=A$(1 TO O)+D$+A$(E TO LEN A$)
2580 CLS
2590 GOSUB 2300
2595 RETURN
2600 CLS
2602 PRINT "WHAT DO YOU WANT TO CHANGE THE
       START TIME TO ?"
2605 INPUT T$
2610 LET Q=0
2620 LET O=T
2625 LET O=O-1
2630 IF A$(O)=CHR$ 13 THEN LET Q=Q+1
2635 IF Q=3 AND A$(O)=CHR$ 13 THEN LET E=O
2640 IF Q=4 THEN GOTO 2660
2650 GOTO 2625
2660 LET A$=A$ (1 TO O)+T$+A$+(E TO O LEN A$)
2670 CLS
2680 GOSUB 2300
2695 RETURN
2700 CLS
2704 PRINT "WHAT DO YOU WANT TO CHANGE THE
       FINAL TIME TO ?"
2706 INPUT F$
2710 LET Q=0
2720 LET O=T
2730 LET O=O-1
2735 IF A$(O)=CHR$ 13 THEN LET Q=Q+1
2740 IF Q=2 AND A$(O)=CHR$ (13) THEN LET E=O
2745 IF Q=3 THEN GOTO 2760
2750 GOTO 2730
2760 LET A$=A$(1 TO O)+F$+A$(E TO O LEN A$)
2770 CLS
2780 GOSUB 2300
2790 RETURN
2800 CLS
2810 PRINT "WHAT DO YOU WANT TO CHANGE THE
       CALLSIGN TO ?"
2820 INPUT C$
2825 LET Q=0
2830 LET O=T
2833 LET O=O-1
2835 IF A$(O)=CHR$ 13 THEN LET Q=Q+1
2840 IF Q=1 AND A$(O)=CHR$ 13 THEN LET E=O
2850 IF Q=2 THEN GOTO 2860
2855 GOTO 2833
2860 LET A$=A$(1 TO O)+C$+A$(E TO O LEN A$)
2870 CLS
2880 GOSUB 2300
2890 RETURN
2900 CLS
2903 PRINT "WHAT DO YOU WANT TO CHANGE THE
       NOTES TO ?"
2905 INPUT N$
2910 LET O=T
2920 LET O=O-1
2930 IF A$(O)=CHR$ 13 THEN GOTO 2940
2935 GOTO 2920
2940 LET A$=A$(1 TO O)+N$+A$(T TO O LEN A$)
2950 CLS
2960 GOSUB 2300
2970 RETURN
3000 CLS
3010 PRINT "WHICH ENTRY WOULD YOU LIKE TO
       SEE ?"
3020 INPUT U
3025 IF U>J THEN PRINT "THIS ENTRY NUMBER HAS
       NOT BEEN REACHED YET "
3026 IF U>J THEN GOTO 30
3027 LET N=U
3030 CLS
3040 GOSUB 5000
3050 PRINT
3080 CLS
3090 GOTO 30
4000 CLS
4010 PRINT "PLEASE SET UP THE TAPE RECORDER
       AND SET IT GOING ."
4020 PRINT "PLEASE PRESS ANY KEY WHEN THIS
       HAS BEEN DONE."
4030 PAUSE 40000
4040 SAVE "LOGBOOK"   (K in inverse video)
4045 CLS
4050 PRINT "********************************"
4060 PRINT "***PRACTICAL WIRELESS LOGBOOK***"
4070 PRINT "******** BY MIKE WITKOWSKI *****"
4080 PRINT "********      WDX9JFT      *****"
4090 PRINT "********************************"
4100 PAUSE 200
4110 CLS
4120 GOTO 30
5000 FAST
5005 PRINT "                                "
5010 LET T=1
5020 IF A$(T)="+" THEN GOTO 5050
5030 LET T=T+1
5040 GOTO 5020
5050 IF CODE A$(T+1)<>N THEN GOTO 5030
5060 PRINT
5065 LET N=CODE A$(T+1)
5070 PRINT "ENTRY NUMBER :";N
5080 LET T=T+2
5090 LET G=T
5100 GOSUB 5500
5105 LET D$=A$(G TO T-1)
5110 PRINT "DATE OF CONTACT :";D
5120 GOSUB 5500
5130 LET T$=A$(G TO T-1)
5140 PRINT "CONTACT STARTED AT :";T$
5150 GOSUB 5500
5155 LET F$=A$(G TO T-1)
5160 PRINT "CONTACT ENDED AT :";F$
```

```
5170 GOSUB 5500
5175 LET C$=A$(G TO T-1)
5180 PRINT "THE CALLSIGN WAS :";C$
5190 GOSUB 5500
5195 LET N$=A$(G TO T-1)
5200 PRINT "NOTES :";N$
5210 PRINT
5220 PRINT "                                "
5230 SLOW
5235 PAUSE 200
5236 CLS
5240 RETURN
5500 LET T=T+1
5510 LET G=T
5520 IF A$(T)=CHR$ 13 THEN RETURN
5530 LET T=T+1
5540 GOTO 5520
6000 CLS
6010 PRINT "WHICH ENTRY DO YOU WANT A
       COPY OF ?"
6020 INPUT S
6025 CLS
6030 IF S>N THEN PRINT "THIS ENTRY HAS NOT
       YET BEEN MADE"
6040 IF S>N THEN GOTO 6010
6050 LET N=6
6060 GOSUB 5000
6070 PRINT "IS THIS THE ENTRY YOU WANT TO
         COPY ?(Y/N)"
6075 PAUSE 40000
6080 LET K$=INKEY$
6090 IF K$<>"Y" THEN GOTO 6000
6093 CLS
6095 PRINT "PRESS ANY KEY WHEN THE PRINTER
       IS READY"
6096 PAUSE 40000
6097 CLS
6100 LPRINT "                                "
6110 LPRINT
6120 LPRINT "ENTRY NUMBER :";N
6130 LPRINT "DATE  :";D$
6140 LPRINT "CONTACT STARTED :";T$
6150 LPRINT "CONTACT ENDED :";F$
6160 LPRINT "CALLSIGN :";C$
6170 LPRINT "NOTES :";N$
6180 LPRINT
6190 LPRINT "                                "
6200 GOTO 30
```

Here is a list of Sinclair User Groups

1st Sinclair Users Group of Phoenix
c/o 9009 West Elm Street #2
Phoenix, AZ 85037

Washington Area Users Group
Timex/Sinclair
c/o Steve Wyatt
P.O. Box 5239
Washington, DC 20015

The South Florida ZX Users Group
P.O. Box 57381
West Palm Beach, FL 33405

Timex/Sinclair Bay Area Microcomputer Users Group
P.O. Box 644
Safety Harbor, FL 33572

Timex/Sinclair Computer Club of Central Florida
808 East Anderson Street
Orlando, FL 32801

T/S Technologies User Group
c/o Jose Moreno
11331 SW 4th Street
Miami, FL 33165

Z-X Timex Group
950 Cynthia Drive
Titusville, FL 32780

Well, that's it for now. Please don't forget to send me your comments and suggestions. Happy computing. Please send any correspondence to:

Joe C. Smith Jr.
P.O. Box B-36085
Florence, AZ 85232

(Editor's note: There may be some typos in the use of O's and O's. If problems are experienced, experiment!

Adding a Schon Keyboard to the QL

Bob Howard - WA6DLI

First, I should tell you that I have three QL's, two that were kits and one that was factory assembled (or was it A+ assembled?), as the kits seemed to be the knocked down version that was imported as parts rather than as computers! I am not rich, it is just that one was bought as a backup without power supply or documentation for $99, and two as kits with documentation. Once you have bought a QL, A+ Computer Response will sell you a spare.

Now you may ask, why in heck should you get a keyboard for the QL as it is already a pretty one in that European style with the square keys and dished depressions. It seems that if you are not a typist with perfect aim to hit the center of a key, it is very easy to hit the dividing line between two keys with the expected result of getting no response or a 50% chance of the wrong

response. Also some QL's have keys that tend to stick if not hit squarely. The ENTER key is notorious for this as it is L-shaped and hitting the top of the L is not a good idea. Sort of like hitting the end of the TS-2068 space bar. Some energetic people such as John Oliger, have disassembled the QL keyboard and filed and oiled keys until they were faultless. The newsletter-magazine SUM had an article on refurbishing the 2068 space bar.

Anyway in England, there have been several keyboards announced for the QL and the Schon is the first and from some write-ups perhaps the best. Since my QL's must be kept alive to justify the peripherals which cost more than the computer, I decided to try the Schon keyboard as I am a fair typist and have been spoiled recently with my Epson QX-10 computer's keyboard. (The QX-10 HASCI keyboard and the TeleVideo computer are supposed to have the best keyboards on computers). To show the sad state of expensive computers, my QX-10 was acquired complete with an MS-DOS board and 512K memory in trade for a Minolta XD-5 camera and three lenses.

The Schon (with an umlauted "o"), means beautiful in German. So I expected a German keyboard but it is made in England. The keyboard mechanism is wrapped in a separate plastic from the new top which is identical to the QL top including the Sinclair and QL logos. This isn't quite true. It is probably identical to the top of the British model, but I was shocked to find that my top when removed had heavy metal sheeting backing the keyboard mechanism. Also the plastic was sprayed with a metallic coating and foil glued where the grounding spring of the modulator box touches the top. The Schon keyboard and top has none of this shielding, so may make it more RFI prone. As I type this I don't hear anything in my receiver tuned to 20 meters, I haven't tried transmitting yet, which might spike the computer.

The reason I mentioned my kit computers, is that they match the circuit board my Schon instructions expected. The first instruction is to undo the eight screws holding the top and bottom of the QL together. You then gently lift them apart and unplug the keyboard ribbons, the same hard-to-insert kind that the TS-1000 and TS-2068 used. The next instruction is to lift the special socket holding the wires for the LED lights. This socket in my kits has six holes into which the LED wires are inserted in proper order, and then the socket is pushed down and it locks the wires in place. This is the kind of socket the Schon instruction refers to when they say lift the socket and pull out the wires now released.

Imagine my surprise to find that in my non-kit QL, instead of the locking socket I had a six contact deluxe Molex type fiber keyed plug. This was the good news, but the bad news was that the bare solder tinned wires on my Schon board had no socket to be locked into. I gritted my teeth and cut the matching plug from my QL top LED wires and spliced the wires in the proper order to the wires on the Schon board.

The top frame with the LED wires plugged in is now propped up at the rear of the computer and you lay the keyboard almost in place and plug the Schon ribbons in the ribbon sockets. I was pleased to find they are rugged ribbon cables with a stiff tinned end and easily inserted into the ribbon's sockets!!! This was almost worth the price of the keyboard!

With the ribbons plugged in, you must dress the LED light wires around the modulator so they won't get pinched by the keyboard and then line up the keyboard with three screw holes at rear and the metal tabs in front resting on the bottom half case front edge so the keyboard printed circuit card fits flush in the case. With this held in place you fit the top cover, that was propped up with the LED wires not under strain and close the case. This is easier said than done, as the thicker keyboard ribbons, my soldered plug splice, and the extra grounding straps around the modulator, running to the other sockets on the rear of the computer, were all things the Schon makers didn't count on. I got it squeezed together and fastened the screws.

When all the peripherals, wires and plugs were re-installed, I turned on the computer and held my breath. Everything worked and the keys, except one, are a delight to type on. All tested OK as to contact and function and are very good to type on. Since the keys are tapered like the regular typewriter keys you are used to on typewriters, it is not easy to hit two at once. Except for the shape of the keys and the fact that the function keys F1 to F5 are RED, your QL looks just as before.

I said that one key didn't pass my test. It is the key in the upper right, next to the modulator and has symbol \ and ¦ on it. The reverse slash is only used in program lines as a new print line. And the vertical line is sometimes useful in making boxes in a typed diagram. If I hit that key hard it sticks down and with the repeat function, I get a half page of symbols before I can

unstick it. I have found that if I just touch the key lightly I can print one symbol, so I can live with it. I suspect the pc board of the Schon is not quite clear and is being distorted enough to cause the key to bind. Pushing on the case next to the key will release it so I may get it free with some work later.

What is my verdict on the Schon keyboard? Since it is a delight to type with, I am sold on it and consider the $90 it cost well spent. With the differences between the American computer and the British one in terms of the internal shielding, and hard-to-fit pc board, one should be aware of the risks of distorting the board and increased RFI, due to less shielding, I like the idea of a keyboard that has ribbons that are easy to insert and remove. The Schon instructions do not expect you to solder, but I don't know what percentage of the A+ Computer Resources stock has the Molex plug instead of the locking socket. The Molex is better but requires soldering the old plug to the new Schon LED wires.

The Schon keyboard was obtained from:

Sharp's Inc.
Rt. 10, Box 459
Mechanicsville, VA 23111

Their $89.95 price looked very favorable to the 54.95 (pounds) English price with shipping and duty to be added. If you want literature or tech info the address of Schon Keyboards is :

15 Northcote Crescent
West Horsley,
Surry KT24 6LX
England

It is nice to know that for a defunct computer new hardware and software are coming out every day! I am impressed with my QL plotting Mandelbrot patterns in 8 minutes while I am typing a letter in Quill at the same time with true multi-tasking. This is with Mandelbrot Magic from Currys in Glendale, AZ for $24.95. See Scientific American Magazine 9/85!

T/S 1000, ZX81 & a Flatbed XY Plotter

Edward Radtke - WA4BQE

The versatility of the T/S 1000 and ZX81 computers never ceases to amaze me with its capabilities. Most of us have a pet application for their computers, mine being "computers and motion". This involves my computer controlling a mechanical device, such as motors, robot arms, or even temperature control.

While computer controlled plotters have been around for years, "cheap" commercial plotters haven't, so I waited and watched surplus outlet sales and hamfests. Patience finally paid off, and I managed to locate two plotters, the Houston Omnigraphic Recorder and an F.L. Mosley X-Y plotter.

The next part of the project was the interface circuit design, which proved to be the simplest part of the project. I located several digital-to-analog computer chips (DAC0801LCN 8-bit) and decided to go with them mainly because of the economy involved (they were free). I mailed the specification sheets and my own requirements to my son who is a Systems Engineer. A few days later, he sent the circuitry requirements back which are included in the following description of how I went about construction my project.

Construction Details

I used a 4 1/2" x 6" piece of perf board and wire wrap sockets for the interface board. The connector to the Timex was salvaged from a Westridge 2050 modem board. An ample supply of these boards in "as is" condition have been around for over a year. A comparable length of sixteen conductor flat line was slipped inside the existing shield used for the modem flat line. This was necessary for the additional address and data lines needed.

(Note: Layout of the parts is not critical. Color coded wire simplifies tracing the wiring). Starting from the Timex connector, shown in Figure 1 (see Timex User's Manual p.124 for another connector view), makes the placement of the parts very easy and ends up with two equal sections on the board and two independent outputs which I terminated with RCA phono jacks. I added one extra chip socket and used a dip switch to select for unipolar 0 to 5 volt output or bipolar +5 to -5 volt output (see Figure 2, S1, and S2).

Power Supply

A power supply schematic was not included. I chose to use two power supplies that I purchased at a hamfest and added a few more regulators to provide the plus-minus twelve volt requirement. By providing all the necessary voltages to the interface board, I am able to run it without the computer. This is accomplished by using the "Test Connector" as shown in Figure 3. I power the computer from the original power pack furnished with it. Current requirements for the interface

board are: +5 volts @ 130mA, -5 volts @ 30mA, +10 volts @ 10mA, +12 volts @ 25mA, -12 volts @ 25mA.

A power supply for this type of circuitry is shown in Radio Shack's Archers Engineer's Notebook II p. 114. (Note: Plus and minus 12 volt regulators would have to be added to the circuit to make it complete).

Set-up & Test

I chose to use the test connector shown in Figure 3 and tables in Figure 4 for start up. Using voltmeters on the output of the 741's will show the performance of the interface in both unipolar and bipolar modes. After that I connected the X-Y plotter to the unit and began drawing lines and steps.

The final test was connecting the unit to the computer and making the following adjustments:

DAC 0

1. POKE 16380,0
2. Adjust R2 for -5V on pin 6 of 741
3. POKE 16380,255
4. Adjust R1 for +5V on pin 6 of 741
5. To CHECK: POKE 16380,0 pin 6 of 741 should read -5V. POKE 16380,255 pin 6 of 741 should read +5V. POKE 16380,128 pin 6 of 741 should read 0V.

DAC 1

1. POKE 16381,0
2. Adjust R2 for -5V on pin 6 of 741
3. POKE 16381,255
4. Adjust R1 for +5V on pin 6 of 741
5. To CHECK: POKE 16381,0 pin 6=-5V. POKE 16381,255 pin 6=+5V. POKE 16380,128 pin 6=0V.

The following short programs put the whole system into action and the fun part started!

```
10 PRINT "ENTER X"
20 INPUT X
30 POKE 16380,X
40 GOTO 10
```

```
10 FOR X=0 TO 240 STEP 20
20 FOR Y=0 TO 255
30 POKE 16380,X
40 POKE 16381,Y
50 NEXT Y
60 NEXT X
```

```
10 FOR I=0 TO 255
20 POKE 16380,I
30 POKE 16381,I
40 NEXT I
50 FOR I=255 TO 0 STEP -1
60 POKE 16380,I
70 POKE 16381,I
80 NEXT I
90 GOTO 10
```

There seems to be an endless list of applications for this project and my next add on will be "Optical Photo Digitizing".

I wish to thank Jeff Radtke, Jim Pitts, and Bill Neuling for their technical assistance in this project.

Notes:

1. When test connector is installed, check levels at U7:
   U7 pin 1 = logic 0
   U7 pin 2 = logic 1

2. To use:
   A) Select either DAC0 or DAC1 with switch S1T.
   B) Connect voltmeter to selected DAC's 741, pin 6 (output).
   C) Set up data switches, S2 thru S9:

(MSB) S2	S3	S4	S5	S6	S7	S8	(LSB) S9	output with 25K	output without 25K
0	1	1	1	1	1	1	1	+5	+5
0	0	0	0	0	0	0	0	+2.5	0
1	0	0	0	0	0	0	0	0	-5

   D) Press button momentarily.

(FIGURE 4)

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

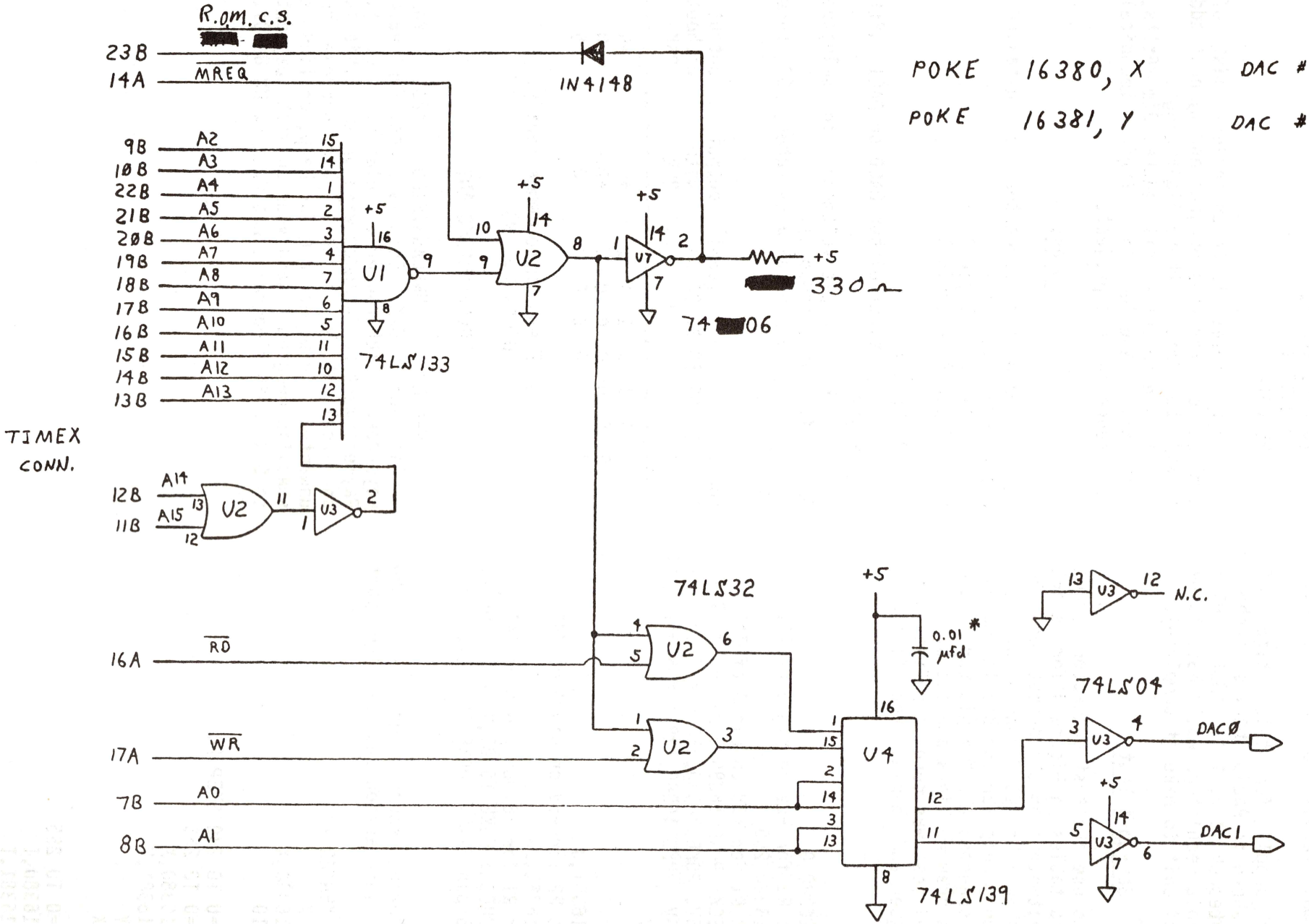
R.O.M. C.S.
[redacted]
23B
14A
MREQ
IN4148
POKE 16380, X
DAC # 0
POKE 16381, Y
DAC # 1
9B A2
10B A3
22B A4
21B A5
20B A6
19B A7
18B A8
17B A9
16B A10
15B A11
14B A12
13B A13
TIMEX CONN.
U1
74LS133
U2
U7
+5
330Ω
74[redacted]06
12B A14
11B A15
U2
U3
74LS32
16A RD
17A WR
7B A0
8B A1
U4
74LS139
0.01 µfd *
N.C.
74LS04
DAC0
DAC1
CHIP SELECT (ADDRESS DECODE)
* PUT DECOUPLING CAP AT EACH I.C.
8-FEB-87

Figure 1

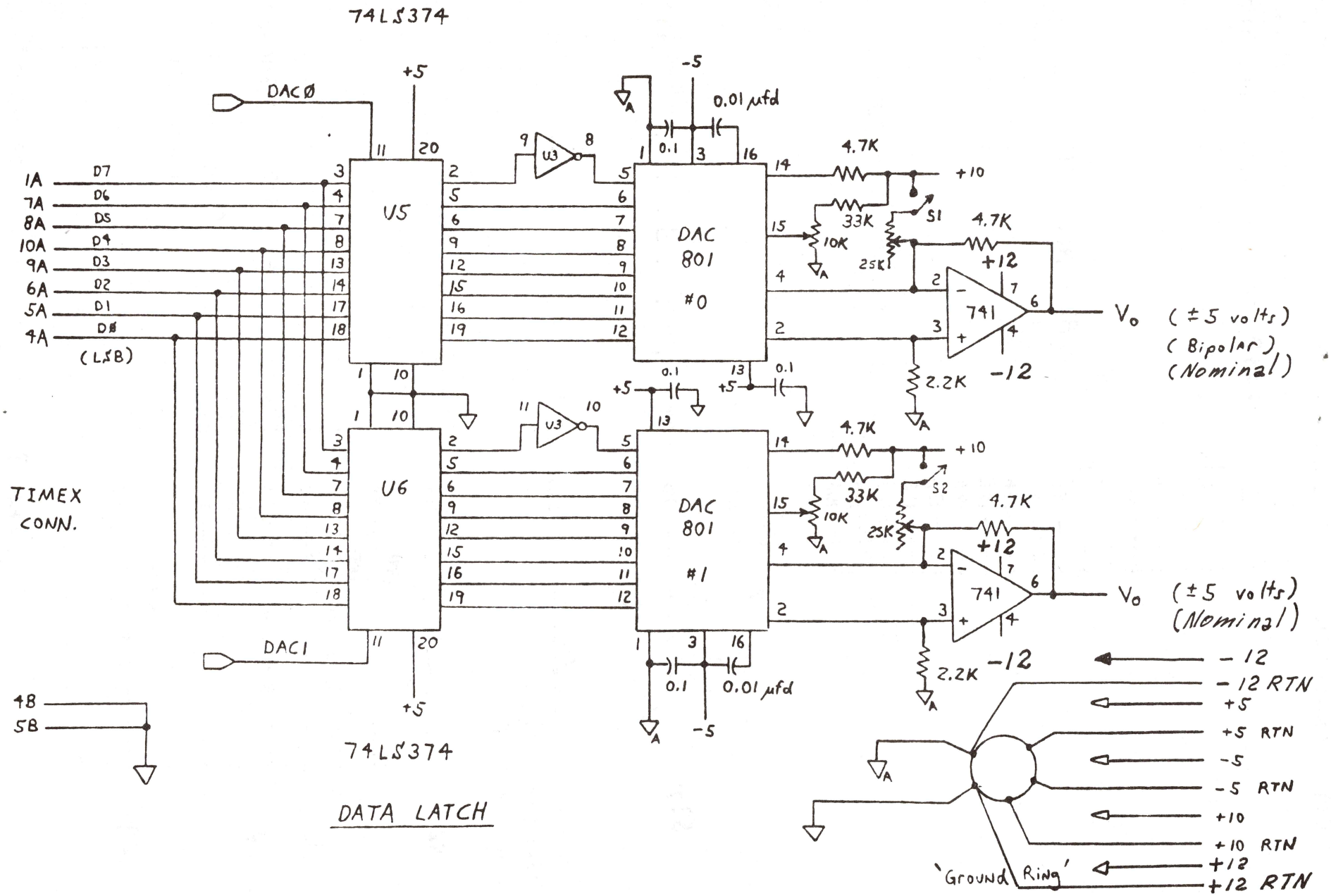
74LS374
DAC Ø
+5
-5
0.01 µfd
1A D7
7A D6
8A D5
10A D4
9A D3
6A D2
5A D1
4A D0
(LSB)
U5
U6
U3
DAC 801 #0
DAC 801 #1
4.7K
+10
33K
10K
25K
S1
S2
+12
741
Vo (±5 volts) (Bipolar) (Nominal)
2.2K
-12
0.1
TIMEX CONN.
4B
5B
DAC 1
74LS374
DATA LATCH
- 12
- 12 RTN
+5
+5 RTN
-5
-5 RTN
+10
+10 RTN
+12
+12 RTN
'Ground Ring'

Figure 2

TEST CONNECTOR - DAC Board

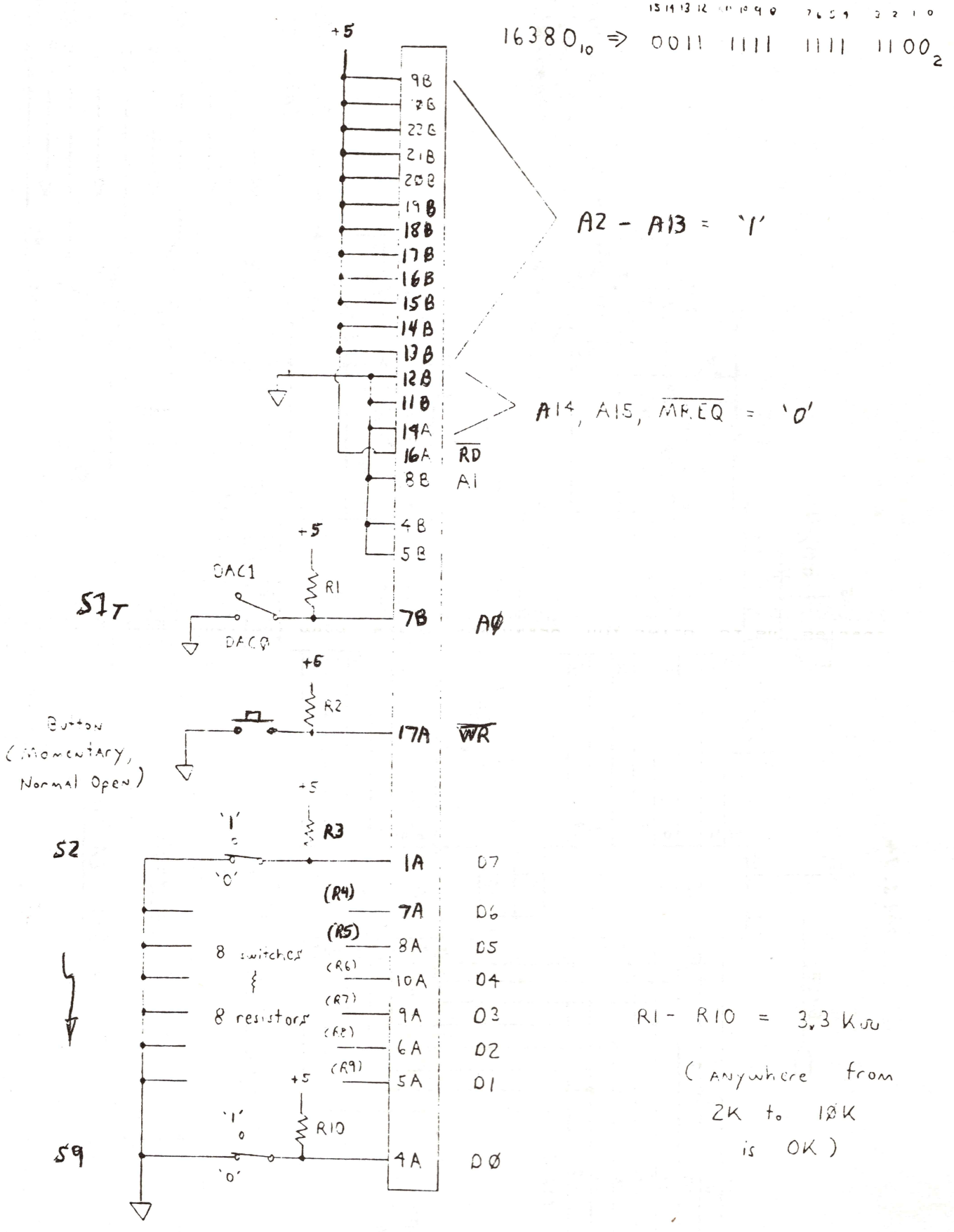

Figure 3

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